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### AMENDMENTS TO THE CLAIMS

✓1. (currently amended) A method to determine the organic acid content of petroleum streams comprising:

- (a) irradiating a sample of said petroleum stream with IR radiation;
- (b) ~~determining the absorption~~ determining an IR absorbance spectrum wherein said IR radiation is only in the spectral ranges having wavelengths 1000-1350  $\text{cm}^{-1}$ , 1550-2200  $\text{cm}^{-1}$ , 2400-2770  $\text{cm}^{-1}$ , and 3420-4800  $\text{cm}^{-1}$ ; and
- (c) correlating all of said wavelengths of said absorption IR absorbance spectrum determined in step (b) with the organic acid content of said petroleum stream using linear multivariate regression analysis.

✓2. (original) The method of claim 1 wherein said organic acid content is in units of ASTM TAN.

✓3. (currently amended) The method of claim 1 further comprising the step of heating a sample of said petroleum stream having boiling points below 1050°F, at a temperature between 25°C and 125°C during said irradiating step.

✓4. (original) The method of claim 3 wherein said temperature is between 40°C and 100°C.

✓5. (original) The method of claim 4 wherein said temperature is between 55°C and 75°C.

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✓6. (currently amended) The method of claim 1 wherein the optical IR absorbance for every spectral frequency is between 0 and 2.0 absorbance units.

✓7. (currently amended) The method of claim 5 wherein the optical IR absorbance for every spectral frequency is between 0 and 1.75 absorbance units.

✓8. (currently amended) The method of claim 3 wherein said sample ~~has~~ is a mixture of petroleum streams having a boiling points below 1050°F.

✓9. (currently amended) The method of claim ~~3~~ 4 wherein said sample is a ~~known~~ mixture of petroleum streams having a boiling points above and below 1050°F.

✓10. (original) The method of claim 1 wherein said IR radiation is in the spectral ranges 1000 and 4800  $\text{cm}^{-1}$ .

✓11. Please cancel claim 11.

✓12. (currently amended) The method of claim 1 further comprising the step of orthogonalizing the ~~absorption~~ IR absorbance spectrum so as to eliminate environmental and instrumental contributions.

13. (currently amended) The method of claim 1 further comprising the step of using said ~~orthogonalized spectra~~ IR absorbance spectrum of a set of samples, the calibration samples, which are representative of the variability of petroleum feed and process streams, to develop a prediction regression model having regression factors to predict the TAN of said streams to an predetermined accuracy ~~that renders the invention useful to the application.~~

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✓14. (currently amended) The method of claim 13 wherein said number of samples is at least 8 times the number of regression factors in the model, ~~and more preferably 10 times the number of regression factors.~~

✓15. (original) The method of claim 13 wherein said samples include both whole crudes and pipestill distillation fractions.

✓16. (currently amended) The method of claim 13 wherein average prediction error for a sample set of whole crude and pipestill and laboratory distillation fractions are less than 0.25 ~~and more preferably less than 0.15 TAN units.~~

✓17. (original) The method of claim 1 utilizing a sufficient number of calibration samples to achieve a predetermined accuracy.

✓18. (original) The method of claim 17 wherein said number of calibration samples exceed 100.

✓19. (original) The method of claim 17 wherein said number of calibration samples exceed 400.

✓20. (currently amended) A method to optimize blending of two or more petroleum feedstreams including organic acids having different levels of TAN wherein the feedstream blend is processed into process streams comprising:

- (a) blending said feedstreams ~~in certain~~ predetermined proportions to form a feedstream blend;
- (b) measuring the TAN level of said feedstream blend and/or said processed streams using the method of claim 1;

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- (c) comparing the TAN level of said feedstream blend and/or process streams to a predetermined TAN level; and
- (d) adjusting the proportions of said feedstreams in the blending step so that the TAN level of the feedstream blend and/or process streams is equal to or less than said predetermined level.

✓21. (currently amended) In a method for determining the TAN value of a crude oil including organic acid, the improvement which comprises determining the TAN level of the crude oil by the method of claim 1, ~~valuing the crude oil according to said TAN level.~~

✓22. (currently amended) A method to optimize the addition of organic acid neutralizing agents to a petroleum feedstream that is processed into process streams comprising:

- (a) determining the ~~optical~~ IR absorbance spectrum of the feedstream and/or processed streams wherein said IR radiation is only in the spectral ranges having wavelengths 1000-1350<sup>-1</sup>, 1550-2200 cm<sup>-1</sup>, 2400-2770 cm<sup>-1</sup>, and 3420-4800 cm<sup>-1</sup>; and
- (b) predicting the organic acid content and/or corrosion of the feedstream and/or processed streams from ~~its~~ all of said wavelengths of said IR spectrum determined in step (a);
- (c) adding the neutralizing agent in batch or intermittent or continuously mixed flow;

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- (d) measuring the ~~optical~~ IR spectrum of the treated feedstream and/or processed streams;
- (e) predicting the remaining acid content and/or the corrosion rate of the treated feedstream and/or processed streams without removing the neutralized products or unreacted neutralizing agent; and
- (f) controlling the amount or blend of neutralizing agents, and/or the temperature, pressure, mixing, or flow conditions in the neutralizing process to achieve the target acid level and/or corrosion rate in the treated feedstream and/or processed streams.

✓23. (new) The method of claim 1 wherein said sample is a mixture of petroleum streams having a boiling point above 1050°F.

✓24. (new) The method of claim 13 wherein said number of samples is at least 10 times the number of regression factors in the model.

✓25. (new) The method of claim 13 wherein said average prediction error for a sample set of whole crude and pipestill and laboratory distillation fractions are less than .15 TAN units.